The Scientific Basis of Yoga Therapy

Research is documenting the effectiveness of yoga therapy and suggesting specific mechanisms for how it works.

By Timothy McCall, M.D.

One of the most exciting developments in the last few decades is the cross-fertilization of Western science with ideas from ancient Eastern wisdom systems such as yoga. With increasing precision, scientists are able to look at the brain and body and detect the sometimes subtle changes that practitioners of yoga and mediation undergo. Years ago, few yoga studies were done in the West, and most scientists dismissed Indian yoga research due to methodological problems, such as a lack of control groups in the studies. Now the methodology is much better, and it could be argued that many Indian studies of yoga are superior to most of those done in the West.

As yoga becomes more and more mainstream, and as research dollars for alternative and complementary health systems continue to grow, studies of yoga are getting not only better but also more numerous in both India and the United States. In just the last few years, research has documented the efficacy of yoga for such conditions as back pain, multiple sclerosis, insomnia, cancer, heart disease, and even tuberculosis. Studies are also increasingly documenting how yoga works. Among its many beneficial effects, yoga has been shown to increase strength, flexibility, and balance; enhance immune function; lower blood sugar and cholesterol levels; and improve psychological well-being. One of yoga's most prominent effects, of course, is stress reduction.

Stress and the Autonomic Nervous System

Although yoga is much more than a stress-reduction method, stress adversely affects a wide range of health conditions, and yoga is arguably the most comprehensive approach to fighting stress ever invented. Stress isn't just a factor in conditions commonly labeled "stress-related," such as migraines, ulcers, and irritable bowel syndrome, but it appears to contribute to such major killers as heart attacks, diabetes, and osteoporosis.

Even diseases such as cancer—for which there is surprisingly little evidence that stress is a causative factor—are extremely stressful once a person has been diagnosed and begins treatment. Yoga can improve not only the quality of life after diagnosis, but it appears to diminish the side effects of surgery, radiation, chemotherapy, and other treatments, and may increase the odds of survival.

To appreciate the role of stress in disease and of relaxation in prevention and recovery, it's important to understand the function of the autonomic nervous system (ANS), which controls the function of the heart, liver, intestines, and other internal organs. The ANS has two branches that work in conjunction: the sympathetic nervous system (SNS) and the parasympathetic nervous system

(PNS). In general, when activity is high in the SNS, it is lower in the PNS, and vice versa.

The SNS, in conjunction with such stress hormones as adrenaline and cortisol, initiate a series of changes in the body, including raising blood pressure, heart rate, and blood sugar levels. These changes help a person deal with a crisis situation. They mean more energy and more blood and oxygen flowing to the large muscles of the trunk, arms, and legs, allowing the person to run from danger or do battle (the so-called "fight-or-flight" response).

The PNS, in contrast, tends to slow the heart and lower the blood pressure, allowing recovery after a stressful event. Blood flow that was diverted away from the intestines and reproductive organs, whose function isn't essential in an emergency, returns. In contrast to fight or flight, these more restorative functions can be thought of as "rest and digest." They are also sometimes dubbed the relaxation response.

Many yoga practices, including quiet asana, slow breathing, meditation, and guided imagery, increase activation of the PNS and lead to mental relaxation. Yoga techniques are more than just relaxation, however. Practices like vigorous sun salutations, kaphalabhati breathing, and breath retentions actually activate the SNS. One of yoga's secrets, documented in research from the Swami Vivekananda Yoga Research Foundation near Bangalore, is that more active practices followed by relaxing ones lead to deeper relaxation than relaxing practices alone.

Neuroplasticity

I believe some of yoga's most profound effects on health have to do with its ability to alter long-standing dysfunctional behavior. People often have unhealthy habits of thought and deed that undermine their health—habits they may recognize but haven't been able to change. In addition to the direct health benefits of asana, pranayama, meditation, and other yoga practices, it's not uncommon for regular practitioners to start eating better, to cut back on caffeine or alcohol, to quit jobs with unreasonable demands, or to spend more time in nature. Once people become more sensitive to the effects of different actions on their bodies and minds (whether it is practicing alternate nostril breathing or eating huge, fatty meals), they increasingly *want* to do what makes them feel better.

The modern understanding of the brain is that rather than being a static structure (which is what I was taught in medical school), this organ is constantly remodeling itself, a phenomenon scientists call neuroplasticity. Repeated thoughts and actions can rewire your brain, and the more you do something, the stronger those new neural networks become. Almost 2,000 years ago, Patanjali was onto this when he suggested that the key to success in yoga is dedicated, uninterrupted practice over a long period of time. The resulting neural networks— or samskaras, as yogis call them—get stronger and stronger as you stay with the practice. Slowly but surely, these healthy grooves of thought and action help guide people out of the ruts in which they've been stuck.

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